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EXAMINER

PIZIALI, ANDREW T

ART UNIT	PAPER NUMBER
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1771

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/589,055

Applicant(s)

RASMUSSEN ET AL.

Examiner

Andrew T Piziali

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-37 and 48-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-37 and 48-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Decision Rendered

1. In view of the Reversal and Remand by the Board of Patent Appeals and Interferences filed on 8/31/2004, the finality of the Office Action mailed on 9/30/2002 is withdrawn and prosecution is hereby reopened.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 28 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims mention a “nitrite” but the specification teaches a “nitrate” (see paragraph bridging pages 9 and 10).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 3,763,051 to Spiegel et al. (hereinafter referred to as Spiegel).

Regarding claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54, Spiegel discloses a

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substrate comprising an anode electrode wherein phosphor particles are bonded to the anode electrode by submerging the substrate into a phosphor binder solution, and removing the substrate from the binder solution (see entire document).

Speigel does not specifically mention removing the substrate from the binder at a predetermined rate, but it is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). The burden has been shifted to the applicant to show obvious difference between the claimed product and the prior art product. *In re Marosi*, 218 USPQ 289 (Fed. Cir. 1983). The applied prior art either anticipated or strongly suggested the claimed subject matter. It is noted that if the applicant intends to rely on Examples in the specification or in a submitted declaration to show non-obviousness, the applicant should clearly state how the Examples of the present invention are commensurate in scope with the claims and how the Comparative Examples are commensurate in scope with the applied prior art.

Regarding claims 18, 23-24, 36-37 and 53-54, Speigel discloses that the substrate may be fired at a temperature between 400 and 500°C (column 2, lines 6-8 and lines 38-41).

Regarding claims 19, 21, 33 and 50, Speigel discloses that the binder solution may comprise potassium silicate and water (paragraph bridging columns 1 and 2).

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Regarding claims 25-30, Spiegel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel in view of USPN 6,214,419 to Dinh et al. (hereinafter referred to as Dinh).

Regarding claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54, Spiegel discloses a substrate comprising an anode electrode wherein phosphor particles are bonded to the anode electrode by submerging the substrate into a phosphor binder solution, and removing the substrate from the binder solution (see entire document).

Speigel is silent with regards to the rate of removal of the substrate from the binder solution, therefore, it would have been obvious to look to the prior art for a teaching concerning take-up speeds. Dinh provides this teaching disclosing that it is known that a coating thickness generally increases with the coating material concentration and with the take-up speed (column 1, lines 37-47 and column 6, lines 14-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the take-up speed based on the concentration of the coating and based on the desired coating thickness, motivated by the expectation of successfully practicing the invention of Speigel.

Regarding claim 18, 23-24, 36-37 and 53-54, Spiegel discloses that the substrate may be fired at a temperature between 400 and 500°C (column 2, lines 6-8 and lines 38-41).

Regarding claims 19, 21, 33 and 50, Spiegel discloses that the binder solution may comprise potassium silicate and water (paragraph bridging columns 1 and 2).

Regarding claims 25-30, Spiegel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in

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the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

8. Claims 20, 32 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of USPN 4,293,586 to Unnai et al. (hereinafter referred to as Unnai).

Speigel does not mention a specific potassium silicate weight percentage range. Since Spiegel is silent with regards to a specific potassium silicate weight percentage range, it would have been necessary and thus obvious to look to the prior art for conventional potassium silicate weight percentage ranges. Unnai provides this conventional teaching showing that it is known in the art that the adhesive property of a phosphor layer is improved when 0.05 to 0.5 weight percent potassium silicate is utilized (see entire document including column 4, lines 41-57). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use 0.05 to 0.5 weight percent potassium silicate, as taught by Unnai, motivated by the expectation of successfully practicing the invention of Spiegel.

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9. Claims 20, 32 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel in view of USPN 6,214,419 to Dinh as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of USPN 4,293,586 to Unnai.

Speigel does not mention a specific potassium silicate weight percentage range. Since Speigel is silent with regards to a specific potassium silicate weight percentage range, it would have been necessary and thus obvious to look to the prior art for conventional potassium silicate weight percentage ranges. Unnai provides this conventional teaching showing that it is known in the art that the adhesive property of a phosphor layer is improved when 0.05 to 0.5 weight percent potassium silicate is utilized (see entire document including column 4, lines 41-57). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use 0.05 to 0.5 weight percent potassium silicate, as taught by Unnai, motivated by the expectation of successfully practicing the invention of Speigel.

10. Claims 22, 34 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of USPN 5,723,070 to Kim et al. (hereinafter referred to as Kim).

Speigel discloses that the binder solution may comprise potassium silicate and alcohol (paragraph bridging columns 1 and 2), but Speigel does not specifically mention an organo silicate. Kim discloses that it is known in the display device art that potassium silicate and ethyl silicate (an organo silicate) are functionally equivalent interchangeable binders (see entire document including column 1, line 65 through column 2, line 51). It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the potassium silicate binder with an ethyl silicate binder, as taught by Kim, because it has been held to be

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within the general skill of a worker in the art to select a known material on the basis of its suitability.

11. Claims 22, 34 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Speigel in view of USPN 6,214,419 to Dinh as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of USPN 5,723,070 to Kim.

Speigel discloses that the binder solution may comprise potassium silicate and alcohol (paragraph bridging columns 1 and 2), but Speigel does not specifically mention an organo silicate. Kim discloses that it is known in the display device art that potassium silicate and ethyl silicate (an organo silicate) are functionally equivalent interchangeable binders (see entire document including column 1, line 65 through column 2, line 51). It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the potassium silicate binder with an ethyl silicate binder, as taught by Kim, because it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability.

12. Claims 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Speigel as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of any one of USPN 5,200,233 to Mohacsi and USPN 5,569,485 to Dahlquist et al. (hereinafter referred to as Dahlquist), in view of any one of USPN 4,365,184 to Higton et al. (hereinafter referred to as Higton) and USPN 4,983,847 to Bryan et al. (hereinafter referred to as Bryan).

Speigel discloses the presence of isopropyl alcohol (paragraph bridging columns 1 and 2), but Spiegel does not mention the additional use of glycerol in the binder solution. Mohacsi

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and Dahlquist each discloses that it is known in the art to add glycerol to a phosphor binding solution to improve the viscosity and/or provide antistatic protection (see entire document of Mohacsi including column 2, lines 34-43 and column 4, lines 3-30, see entire document of Dahlquist including column 3, line 52 through column 4, line 44). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add glycerol to the binder solution of Spiegel, as taught by each of Mohacsi and Dahlquist, because the glycerol would improve the viscosity and/or provide antistatic protection.

Spiegel does not mention the use of an indium nitrate electrolyte, but Higton, and Bryan each disclose that it is known in the art to add an indium nitrate electrolyte to a phosphor binding solution to increase prompt emission, reduce afterglow, and/or increase electroluminescence (see entire document of Higton including column 1, lines 8-40, and see entire document of Bryan including Examples 86-93). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an electrolyte to the binder solution of Spiegel, as taught by each of Higton, and Bryan, because the electrolyte would increase prompt emission, reduce afterglow, and/or increase electroluminescence.

Spiegel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the

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phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

13. Claims 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel in view of USPN 6,214,419 to Dinh as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of any one of USPN 5,200,233 to Mohacsi and USPN 5,569,485 to Dahlquist, in view of any one of USPN 4,365,184 to Higton, and USPN 4,983,847 to Bryan.

Spiegel discloses the presence of isopropyl alcohol (paragraph bridging columns 1 and 2), but Spiegel does not mention the additional use of glycerol in the binder solution. Mohacsi and Dahlquist each discloses that it is known in the art to add glycerol to a phosphor binding solution to improve the viscosity and/or provide antistatic protection (see entire document of Mohacsi including column 2, lines 34-43 and column 4, lines 3-30, see entire document of Dahlquist including column 3, line 52 through column 4, line 44). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add glycerol to the binder solution of Spiegel, as taught by each of Mohacsi and Dahlquist, because the glycerol would improve the viscosity and/or provide antistatic protection.

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Speigel does not mention the use of an indium nitrate electrolyte, but Higton, and Bryan each disclose that it is known in the art to add an indium nitrate electrolyte to a phosphor binding solution to increase prompt emission, reduce afterglow, and/or increase electroluminescence (see entire document of Higton including column 1, lines 8-40, and see entire document of Bryan including Examples 86-93). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an electrolyte to the binder solution of Speigel, as taught by each of Higton, and Bryan, because the electrolyte would increase prompt emission, reduce afterglow, and/or increase electroluminescence.

Speigel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Speigel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Speigel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

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14. Claims 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of any one of USPN 5,200,233 to Mohacsi and USPN 5,569,485 to Dahlquist, in view of USPN 3,617,743 to Rabatin.

Speigel discloses the presence of isopropyl alcohol (paragraph bridging columns 1 and 2), but Spiegel does not mention the use of glycerol in the binder solution. Mohacsi and Dahlquist each discloses that it is known in the art to add glycerol to a phosphor binding solution to improve the viscosity and/or provide antistatic protection (see entire document of Mohacsi including column 2, lines 34-43 and column 4, lines 3-30, see entire document of Dahlquist including column 3, line 52 through column 4, line 44). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add glycerol to the binder solution of Spiegel, as taught by Mohacsi and Dahlquist, because the glycerol would improve the viscosity and/or provide antistatic protection.

Speigel does not mention the use of a cerium nitrate electrolyte, but Rabatin discloses that it is known in the art to add cerium to a phosphor binding solution to increase sensitivity (see entire document of Rabatin including the abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add cerium to the binder solution of Spiegel, as taught by each of Rabatin, because the cerium would increase sensitivity.

Speigel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a

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phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

15. Claims 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel in view of USPN 6,214,419 to Dinh as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of any one of USPN 5,200,233 to Mohacsi and USPN 5,569,485 to Dahlquist, in view of USPN 3,617,743 to Rabatin.

Speigel discloses the presence of isopropyl alcohol (paragraph bridging columns 1 and 2), but Spiegel does not mention the use of glycerol in the binder solution. Mohacsi and Dahlquist each discloses that it is known in the art to add glycerol to a phosphor binding solution to improve the viscosity and/or provide antistatic protection (see entire document of Mohacsi including column 2, lines 34-43 and column 4, lines 3-30, see entire document of Dahlquist including column 3, line 52 through column 4, line 44). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add glycerol to the binder

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solution of Spiegel, as taught by Mohacsi and Dahlquist, because the glycerol would improve the viscosity and/or provide antistatic protection..

Spiegel does not mention the use of a cerium nitrate electrolyte, but Rabatin discloses that it is known in the art to add cerium to a phosphor binding solution to increase sensitivity (see entire document of Rabatin including the abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add cerium to the binder solution of Spiegel, as taught by each of Rabatin, because the cerium would increase sensitivity.

Spiegel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

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16. Claims 26 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of any one of USPN 5,200,233 to Mohacsi and USPN 5,569,485 to Dahlquist, in view of USPN 4,365,184 to Higton.

Speigel discloses the presence of isopropyl alcohol (paragraph bridging columns 1 and 2), but Spiegel does not mention the use of glycerol in the binder solution. Mohacsi and Dahlquist each discloses that it is known in the art to add glycerol to a phosphor binding solution to improve the viscosity and/or provide antistatic protection (see entire document of Mohacsi including column 2, lines 34-43 and column 4, lines 3-30, see entire document of Dahlquist including column 3, line 52 through column 4, line 44). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add glycerol to the binder solution of Speigel, as taught by Mohacsi and Dahlquist, because the glycerol would improve the viscosity and/or provide antistatic protection.

Speigel does not mention the use of a thorium nitrate electrolyte, but Higton discloses that it is known in the art to add thorium to a phosphor binding solution to increase electroluminescence (see entire document of Higton including column 1, lines 8-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add thorium to the binder solution of Speigel, as taught by Higton, because the thorium would increase electroluminescence.

Speigel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate

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subsequent to the dip coating binding process. The applicant discloses that in addition to a phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

17. Claims 26 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel in view of USPN 6,214,419 to Dinh as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of any one of USPN 5,200,233 to Mohacsi and USPN 5,569,485 to Dahlquist, in view of USPN 4,365,184 to Higton.

Spiegel discloses the presence of isopropyl alcohol (paragraph bridging columns 1 and 2), but Spiegel does not mention the use of glycerol in the binder solution. Mohacsi and Dahlquist each discloses that it is known in the art to add glycerol to a phosphor binding solution to improve the viscosity and/or provide antistatic protection (see entire document of Mohacsi including column 2, lines 34-43 and column 4, lines 3-30, see entire document of Dahlquist including column 3, line 52 through column 4, line 44). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add glycerol to the binder

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solution of Spiegel, as taught by Mohacsi and Dahlquist, because the glycerol would improve the viscosity and/or provide antistatic protection.

Spiegel does not mention the use of a thorium nitrate electrolyte, but Higton discloses that it is known in the art to add thorium to a phosphor binding solution to increase electroluminescence (see entire document of Higton including column 1, lines 8-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add thorium to the binder solution of Spiegel, as taught by Higton, because the thorium would increase electroluminescence.

Spiegel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

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18. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of any one of USPN 4,365,184 to Higton, USPN 4,983,847 to Bryan, and USPN 3,617,743 to Rabatin.

Spiegel does not mention the use of an electrolyte, but Higton, Bryan and Rabatin each disclose that it is known in the art to add an electrolyte to a phosphor binding solution to increase prompt emission, reduce afterglow, increase electroluminescence and/or increase sensitivity (see entire document of Higton including column 1, lines 8-40, see entire document of Bryan including Examples 86-93, and see entire document of Rabatin including the abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an electrolyte to the binder solution of Spiegel, as taught by each of Higton, Bryan and Rabatin, because the electrolyte would increase prompt emission, reduce afterglow, increase electroluminescence and/or increase sensitivity.

Spiegel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and

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2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

19. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,763,051 to Spiegel in view of USPN 6,214,419 to Dinh as applied to claims 16-19, 21, 23-31, 33, 35-37, 48, 50 and 52-54 above, and further in view of any one of USPN 4,365,184 to Higton, USPN 4,983,847 to Bryan, and USPN 3,617,743 to Rabatin.

Spiegel does not mention the use of an electrolyte, but Higton, Bryan and Rabatin each disclose that it is known in the art to add an electrolyte to a phosphor binding solution to increase prompt emission, reduce afterglow, increase electroluminescence and/or increase sensitivity (see entire document of Higton including column 1, lines 8-40, see entire document of Bryan including Examples 86-93, and see entire document of Rabatin including the abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an electrolyte to the binder solution of Spiegel, as taught by each of Higton, Bryan and Rabatin, because the electrolyte would increase prompt emission, reduce afterglow, increase electroluminescence and/or increase sensitivity.

Spiegel does not mention a dip coating step with the claimed non-aqueous solution, but on page 9, line 1 through page 10, line 8, of the current specification, the applicant discloses that the claimed dip coating step simply deposits phosphor particles on the surface of the substrate subsequent to the dip coating binding process. The applicant discloses that in addition to a

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phosphor screening process the adherence of the phosphor particles to the substrate may be accomplished via alternative methods known to those of ordinary skill in the art. Rather than depositing the phosphor particles on the substrate in a first dip coating step and then binding the phosphor particles to the substrate and to each other in a second dip coating step, Spiegel includes phosphor particles in the phosphor binder solution (paragraph bridging columns 1 and 2). Spiegel discloses that this phosphor particle deposition process results in a uniform layer of phosphor particles deposited on the surface of the substrate (column 1, lines 19-23). It is the examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T Piziali whose telephone number is (571) 272-1541. The examiner can normally be reached on Monday-Friday (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

atp

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ANDREW T. PIZALI
PATENT EXAMINER

Elizabeth M. Cole
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